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ABSTRACT

A study examined the phoneme-grapheme correspondence in native English-speaking kindergartners' spelling and compared it to the results of similar research with Spanish-speaking children. It tested the hypothesis that English-speaking children make their first grapheme-sound correspondences differently because of phonological differences in the languages. The subjects of the study were 192 kindergarteners from five public schools: 30 were suburban middle-class Caucasian, 20 suburban middle-class Black, and 47 urban lower-class Black children in Alabama, plus 54 middle-class and 41 lower-class Caucasian children in a small town in Nebraska. The English-speaking children were found to make their first correspondences by consonants rather than by syllables, and signs of conflict were found between children's construction of their own spelling systems and the instruction received at the alphabetic level. (Author/MSE)

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Spelling in Kindergarten: A Constructivist Analysis Comparing Spanish-Speaking and English-Speaking Children

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Running Head: SPELLING IN KINDERGARTEN

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Abstract

Ferreiro and Teberosky ([1979] 1982) studied Spanish-speaking children's construction of spelling. By asking children between the ages of 4 and 6 to write certain words, they identified four levels of development from strings of "letters" to conventional spelling. They also found that children made their first grapheme-sound correspondences at Level 3 by syllables, e.g., writing 3 letters ("aao") for a 3-syllable word (caballo). Spanish is mainly syllable-timed while English is mainly stress-timed. To test the hypothesis that English-speaking children therefore make their first grapheme-sound correspondences differently, we asked 192 kindergarten children to write 8 words such as punishment and cement. English-speaking children were found to make their first grapheme-sound correspondences by consonants ("pnmt" and "cmnt"). Signs of conflict were also discovered between children's construction of their own systems and the instruction received at Level 4 (the alphabetic level).

Spelling in Kindergarten: A Constructivist Analysis Comparing Spanish-Speaking and English-Speaking Children

Many researchers in America (Read, 1975; Henderson, 1981; C. Chomsky, 1979; Bissex, 1980) have shown repeatedly that young children "invent" spelling by going through several levels of being "wrong" and not by associating isolated sounds and letters that are taught one after another. These findings have inspired many kindergarten and first grade teachers to change their methods of teaching from giving phonics lessons to encouraging children to figure out (invent) their own spelling. Very little is known about how children construct knowledge in the transition between scribbling and spelling. The only research available on this topic was done by Ferreiro and Teberosky ([1979] 1982) and by Ferreiro and Gómez Palacio (1982).

Working in Argentina with Spanish-speaking 4-to-6-year olds, Ferreiro and Teberosky based their research on the theory of Jean Piaget. According to Piaget, children begin to construct their knowledge about astronomy, meteorology, botany, and geology long before they go to school (Piaget, [1926] 1967). Ferreiro and Teberosky hypothesized that preschool children must likewise have many ideas about written words, which are cultural objects in their environment. They state, "An intellectually active learner does not necessarily carry out observable activities. An active learner compares, excludes, orders, categorizes, reformulates, confirms, forms hypotheses, and reorganizes through internalized action (thought) or through effective action (according to the level of development)" (Ferreiro and Teberosky, [1979] 1982, p. 15).

In one of their studies Ferreiro and Teberosky asked 4-to-6-year-olds to write words whose written form was already familiar (e.g., their own name) and those that were unfamiliar in written form (e.g., sapo (toad)). They then identified five levels of writing development. At Level 1, children wrote strings such as those in Figure 1(a). A characteristic of these strings is that they all look alike. Sometimes, the children at this level introduced a figurative correspondence between the writing and the object it refers to; they produced a much longer string for bear than for duck because bears are much bigger than ducks.

Insert Figure 1 about here

At the second level (see figure 2(a)), the children's writing revealed new ideas about how words are written. They made their words have a minimum and a maximum number of characters, or a fixed quantity of three or four. The characters became more similar to conventional letters at this level. Moreover, they showed evidence of an important new hypothesis: that each word had to look different if it stood for a different object. If their repertoire of letters was very limited, these children invented a way to make each word look different by varying the order of the characters. We see here the construction of a coherent system that is "wrong" but nevertheless more advanced than the Level 1 strings. Level 2 is more differentiated both among words and within each word.

Insert Figure 2 about here

At the third level, the syllabic level, the child used one character to represent each syllable of a word (Figure 3(a)), but the character had no phonetic value (e.g., " ϙ ϙ " for sapo (toad) and " ⊂ ∪ ○ " for patito (duckling). This level represents a major achievement because the child is showing for the first time that he has constructed the idea that written characters are related to the utterances he makes. At Level 2, by contrast, he focused only on graphic characteristics and on a certain correspondence between writing and meaning.

Insert Figure 3 about here

Ferreiro and Gómez Palacio described a second more advanced type of writing at Level 3 (Figure 3 (b)). The child here used each letter to represent not only a syllable but also a vowel sound. For example, the child at Level 3 as shown in Figure 3(b) wrote "a o" for gato (cat) and "e a o" for pescado (fish).

Ferreiro and Gómez Palacio combined Levels 4 and 5, delineated earlier by Ferreiro and Teberosky, and called it the syllabico-alphabetic level. We decided to refer to the later publication, since it systematizes the earlier research and is based on a much larger sample. As can be seen in Figure 4(a), the child at Level 4 sometimes continued to use each letter to represent a syllable and sometimes to represent a phoneme. In "mriPSa" (mariposa, which means butterfly), for example, "m" and "P" are used to represent syllables, but "ri" and "Sa" are conventional spellings. In other words,

syllabico-alphabetic writing develops by differentiation out of Level 3.

Insert Figure 4 about here

The Ferreiro and Teberosky and the Ferreiro and Gómez Palacio work was carried out with Spanish-speaking children. Spanish is a different language from English in that it is mainly syllable-timed while English is mainly stress-timed. Moreover, many words frequently used by Spanish-speaking children have two or more syllables; in English many words are monosyllabic (e.g., dog (perro), cat (gato), house (casa), and milk (leche)). English has syllables, too, but syllables are much clearer in Spanish than in English. For these reasons we hypothesized that the syllabic level may not occur in children's writing of English words. To test this hypothesis, and to find out if our English-speaking children went through the same levels as the Spanish speakers, we decided to ask kindergarten children to write the following eight words: punishment, cement, pop, vacation, motion, vale/veil, umbrella, and ocean. This list consists of words that are familiar to most young children, but are not likely to appear in an early instructional program. It includes both monosyllabic and multi-syllabic words; some words begin wih consonants and others with vowels.

The subjects of our study consisted of 192 kindergarteners from five public schools: 30 suburban middle-class Caucasian, 20 suburban middle-class Black, and 47 urban lower-class Black children in Alabama, plus 54 middle-class and 41 lower-class Caucasian children in a small town in Nebraska.

The children's spelling was analyzed mostly by three researchers, and sometimes by four. In categorizing children's writing according to the Ferreiro and Teberosky levels, differences of opinion were discussed until consensus was reached. (When definitions of levels were clearer in Ferreiro and Gómez Palacio (1982), we generally used the new criteria and analyses.) When the children wrote at more than one level, the criterion we used was that four or more of the eight words were at a particular level. For example, in Figure 2(c) six words (punishment, pop, vacation, veil, umbrella, and ocean), met the critria for inclusion at Level 2X.

Findings

We found both similarities and differences between the Spanish-speaking and English-speaking children's writing development. The similarities were at Levels 1, 2, and 4; the differences were at Level 3.

In the Ferreiro and Teberosky study, a few lower-class children refused to write; one child in our lower-class sample also refused to write. Three children drew pictures when asked to write the words. For instance, one child was asked to write ocean but drew a circle instead with a boat in the middle. These three children were below Level 1, therefore, we classified them as Level 0 (Table 1).

Insert Table 1 about here

At Level 1 most of the children we interviewed wrote conventional letters (Figure 1(b) and (c)), reflecting the current emphasis on the early teaching of the alphabet by teachers and parents in America. Instead of writing the

strings we saw in Figure 1(a) and the strings of letter-like squiggles reported both by Ferreiro and Teberosky and by Ferreiro and Gómez Palacio, our children at Level 1 wrote strings of letters. It can be seen that writing strings was a characteristic of both groups of children at Level 1.

We categorized our children as belonging to Level 2 if four or more of the eight words written consisted of a fixed quantity of three of four letters or a minimum and a maximum number of letters. (The range was usually from three to four, four to six, five to seven, or three to six letters.) For example, the words in Figure 2(b) have a fixed quantity of three letters, and those in Figure 2(c) have a minimum of three letters and a maximum of five. At Level 2 our findings were again similar to Ferreiro's: our students, too, used the rules they had constructed for themselves (i.e., writing a fixed quantity or a minimum and a maximum quantity as well as a variety of letters in each word).

While the Spanish-speaking and English-speaking children were found to be developing in similar ways at Levels 1 and 2, there was a difference at Level 3. We found no syllabic writing in any of the children we interviewed. Instead of making their letter-sound correspondences by syllables, the children in our sample made their correspondences mostly by consonants (see Figure 3(c)). For example, many children wrote "pnmt" for punishment, "smt" for cement, and "pp" for pop. By contrast, the Spanish-speaking children at Level 3 wrote two characters such as " ϙ ϙ " for sapo. They also wrote two letters for a two-syllable word and three letters for a three-syllable word, e.g. "a o" for gato (cat) and "a a o" for caballo (horse). (Note that the Spanish-speaking children represented each syllable with a vowel.) Therefore,

Level 3 in English appears to call for the name "consonantal" rather than "syllabic."

At Level 4, the Spanish-speaking and English-speaking children were again found to be similar. As can be seen in Figure 4(b), Level 4 in English, too, grows out of Level 3. For example, the consonantal level writing of pnmt differentiated into punishmint just as the syllabic writing a o differentiated into gato. While the mint in punishmint and semint (Figure 4(b)) are "wrong" they are consistently used. The same is true of the sh in vacashun and moshun. These consistencies suggest the construction of a system approaching conventional spelling.

Although our Levels 1, 2, and 4 are similar to those of the Spanish-speaking children, we found writing patterns not reported by Ferreiro and Teberosky or Ferreiro and Gómez Palacio. The words some children wrote had the general characteristics of Levels 1 and 2 except that they had the "correct" first letter of each word. Figures 1(c) and 2(c) are examples of this writing. We called these responses Levels 1X and 2X (see Table 1) to distinguish them from the more naturally constructed levels.

The small category we call 3X is more advanced than 2X and similar to our Level 3, except that the spelling again seems unnatural (see Figure 3(d)). As can be seen in this figure, the child wrote several isolated letters correctly in addition to the first letter. However, this child revealed the absence of any system by writing different endings for punishment and cement, and for vacation, motion, and ocean. She did not differentiate between the length of monosyllabic words like pop and veil and multisyllabic words like cement, motion, vacation, umbrella, and ocean. In fact, this child's writing meets

the criteria for Level 2, but we decided that it contained too many correct beginning and internal consonants to be categorized at Level 2.

Another unnatural category, which we call "X" as shown in Table 1, is illustrated in Figure 5(b). In this category, the children wrote only one letter for each word, the correct beginning letter. Ferreiro and Gõmez Palacio (1982) also reported a small category with only one letter for each word (see Figure 5(a)). However, the Spanish-speaking children made no correspondence between sounds and letters.

Insert Figure 5 about here

It can be seen in Table 1 that the group having the greatest proportion in the columns with "X" was the urban lower-class Black children (46.6%). The groups having the smallest proportions in these columns were the middle-class children in Nebraska (1.8%), and the middle-class Caucasian group in Alabama (13.2%).

Discussion

Our data add support to the theory that children construct one "wrong" system after another before recreating for themselves our conventional system of writing. At Level 1, our children wrote strings just like the Spanish-speaking children. At Level 2, our children were also found to use the rule that words have a minimum and a maximum number of letters, often a fixed quantity of three or four. It is significant to note that no one teaches such rules to young children, as there is no rule in the external world stating that written words have a minimum and a maximum number of

letters. Young children nevertheless seem to construct this general rule as they try to make sense of the Spanish or English writing they see in their environment. While this rule is "wrong," it is much more advanced than the strings at Level 1.

While our Level 3 was found to be consonantal in contrast to the third level of Spanish-speaking children, which was syllabic, the two are similar in a certain sense. Consonantal and syllabic writing both represent the first graphophonetic rule constructed by children, that what they write corresponds in some way to the utterances they make. This is a general rule, and Spanish-speaking children make their first grapheme-sound correspondences through syllables and vowels, while English-speaking children approach these correspondences through consonants.

The categories we distinguished as X must be interpreted in light of the preceding discussion. Levels 1X, 2X, 3X, and X are results of attempts to teach the alphabetic system directly without permitting children to construct the earlier levels. Our first reaction to finding many initial consonants was to be pleased with all the learning the children seemed to have done in school. However, after thinking about children's gradual construction of coherent systems from within by differentiation out of a previous level, we came to the conclusion that the "pasting" of initial consonants must be confusing to the child who is trying to make sense of how writing works. The first correct letter should appear more naturally at Level 3, when children construct for themselves the idea that what they write represents <u>in general</u> the utterances they make. The imposition of the first correct letter at Levels 1 and 2 is likely to confuse children and prevent or slow down the

development of their own ideas about spelling.

The writing of the first correct letter is not in itself rare or unnatural. What is of concern to us is the large percentage of children who wrote all the correct first letters without any idea that all we write must correspond in some way to what we say.

The example of Level 3X given in Figure 3(d) strongly suggests conflicts between the child's natural development and the instruction received. The minimum of three letters and maximum of four (or five) letters would lead us to believe that the child was at Level 2. The instruction he received, however, was alphabetic (Level 4) and the result reveals the lack of a system.

The urban lower-class Black children had the greatest proportion of X's. This is the group that is developmentally the lowest, with 48.8% at Levels 0, 1, and 2 and no one at Levels 3 and 4. These children seem the most vulnerable to the "pasting" of initial letters. The teaching of initial letters was heavily emphasized in the instruction these children received. By contrast, the children in the suburban Caucasian group who received the same type of instruction were already at Levels 3 and 4. At this relatively high level of development, children can likely assimilate or ignore the phonics instruction.

The Nebraska children had a relatively low proportion of X's. These children were in school only two hours and forty-five minutes per day with daily physical education classes and music instruction several times a week. In addition, the teachers in Nebraska were not required to give intensive phonics instruction. These factors probably explain the low proportion of X's.

As Piaget pointed out over many decades, children do not develop from complete ignorance directly to adult forms of knowledge. Rather, they construct their own knowledge by creating many forms which are "wrong" from an adult point of view. In writing, too, they construct one level after another of being "wrong" before constructing the alphabetic level. Early teaching of initial letters and letter sounds may interfere with children's construction of systems that precede the alphabetic level. Further longitudinal research is necessary to understand which instructional practices support or hinder children's efforts to make sense of how spelling works.

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Author Notes

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Table 1

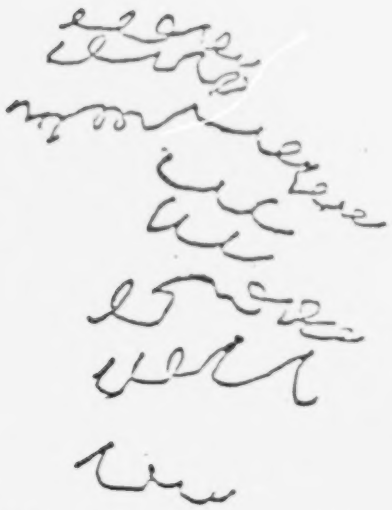
Levels of Spelling of Five Groups of Kindergarteners

Groups	Levels									
	0**	1	2	3	4	1X	2X	3X	X	Proportion in X Columns
Alabama										
Suburban middle-class, Caucasian (n=30)		1 3%		17 56.6%	8 26.6%		2 6.6%		2 6.6%	4 13.2%
Suburban middle-class, Black (n=20)		1 5%	4 20%	8 40%			3 15%	4 20%		7 35%
Urban lower-class, Black (n=47)*	1 2.1%	6 10.6%	17 36.1%			2 4.2%	15 31.9%	3 6.3%	2 4.2%	22 46.6%
Nebraska										
Small town middle-class, Caucasian (n=54)	1 1.8%		4 7%	42 78%	6 11%				1 1.8%	1 1.8%
Small town lower-class, Caucasian (n=41)	1 2.0%	3 7.0%	8 19.5%	22 53.6%			1 2.0%		6 14.6%	7 16.6%

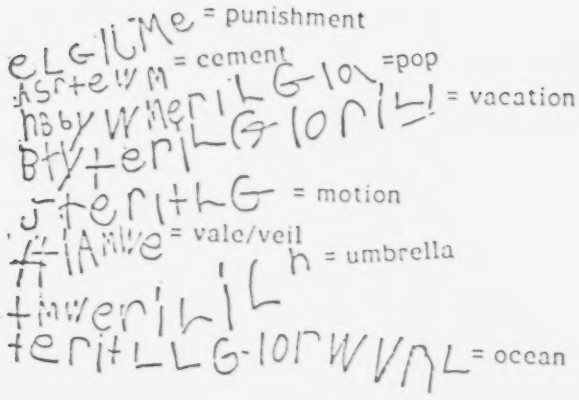
Total n = 192

* One child refused to write
**Level 0 refers to children who drew pictures when asked to write words.

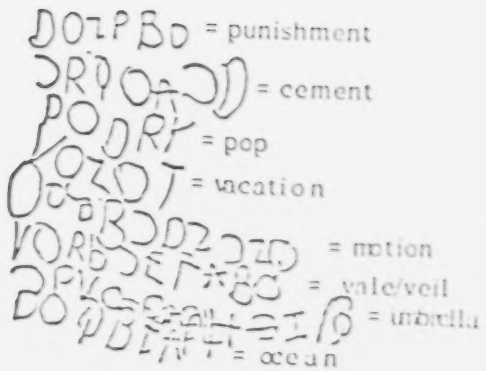
Figure 1. Examples of Level 1



(a) Level 1 from Ferreiro and Teberosky's Study

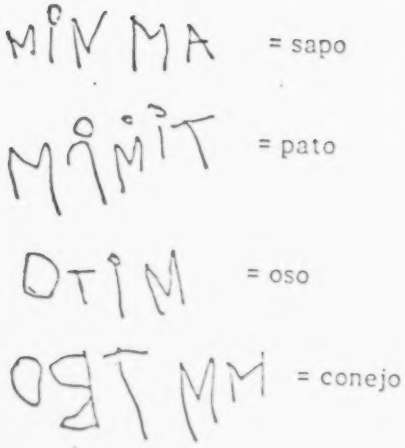


(b) Level 1 from Our Study

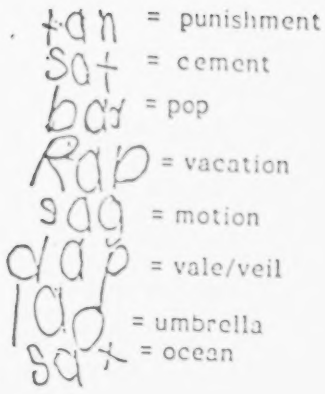


(c) Level 1X from Our Study

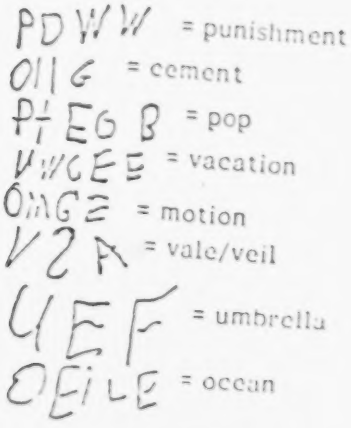
Figure 2. Examples of Level 2



(a) Level 2 from Ferreiro and Teberosky's Study

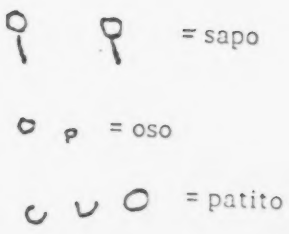


(b) Level 2 from Our Study

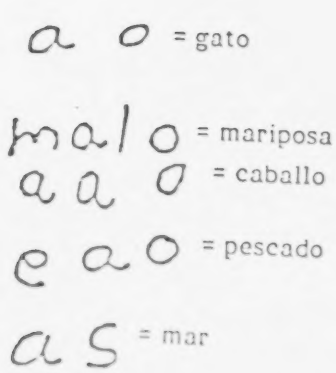


(c) Level 2X from Our Study

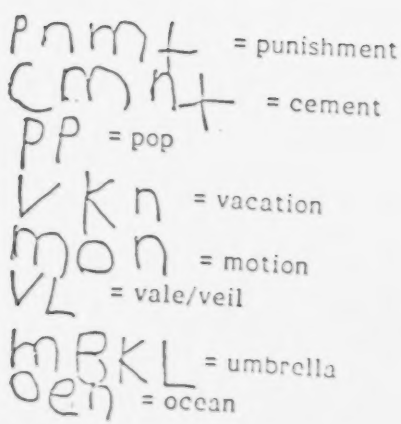
Figure 3. Examples of Level 3



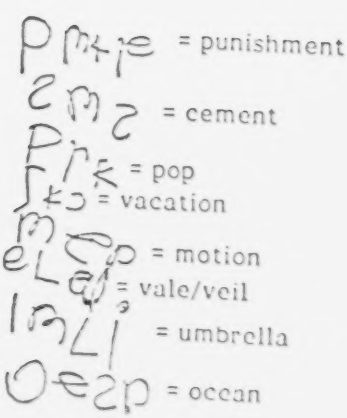
(a) Level 3 from Ferreiro and Teberosky's study



(b) Level 3 from Ferreiro and Gómez Palacio's Study (the Syllabic Level with Sound Value)

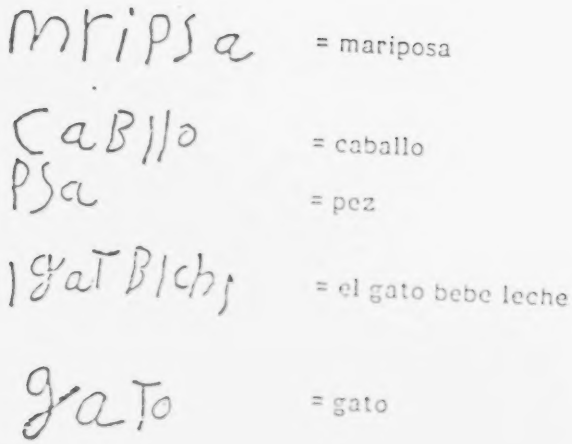


(c) Level 3 from Our Study (the Consonantal Level)

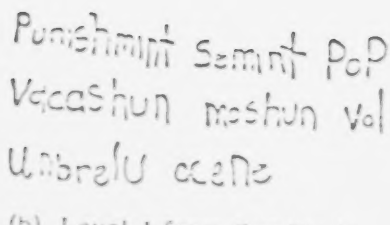


(d) Level 3X from Our Study

Figure 4. Examples of Level 4

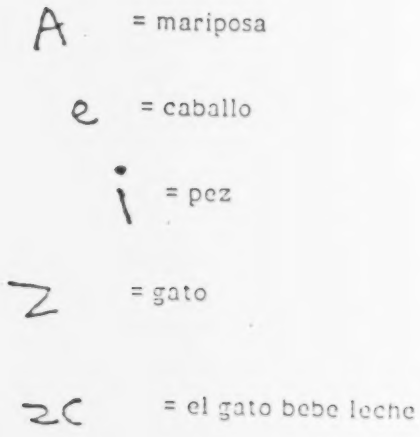


(a) Level 4 from Ferreiro and Gómez Palacio's Study

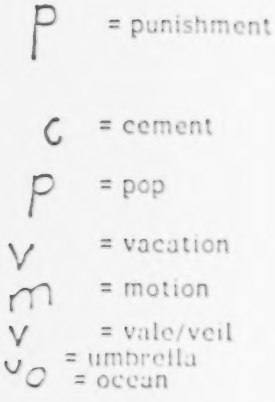


(b) Level 4 from Our Study

Figure 5. Examples of One Letter for Each Word



(a) From Ferreiro and Gómez Palacio's Study



(b) Level X from Our Study